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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,203	07/14/2003	Chee Wei Wong	MIT.9721	6373

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EXAMINER

KANG, JULIANA K

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/619,203

Applicant(s)

WONG ET AL.

Examiner

Juliana K. Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/18/05 (amendment).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/18/05 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

1. Applicant's communication filed on January 18, 2005 has been carefully studied by the Examiner. The arguments advanced therein, considered together with the amendments made to the claims, are not persuasive for the reasons stated set forth below. This action is made final.

The amendment filed January 18, 2005 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: claims 1, 2, 10, 11, 12, and 20 are amended to recite that the membrane is flexible. This limitation was not disclosed in the original disclosure. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 3, 11 and 13 are rejected under 35 U.S.C. 102(a) as being anticipated by Lim et al (WO 02/25338 A2, submitted by applicant).

Lim et al disclose a waveguide micro-resonator (802) comprising a membrane structure (808) that can experience strain (page 19 line 13); and a waveguide element

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formed on said membrane structure so that when said membrane structure is strained, said waveguide element is tuned to selective amount (page 19 lines 17-19). Please note, regarding the method claims above, that method claims 11 and 13 parallel article claims 1 and 3 exactly without the introduction of any particular manufacturing methods, sot that it is proper to examiner the article and method claims together.

4. Claims 1, 5-7, 10, 11, 15-17, and 20 are rejected under 35 U.S.C. 102(a) as being anticipated by Matsuura et al (WO 02/10843 A2, submitted by applicant).

Regarding claims 1 and 11, Matsuura et al disclose a photonic device comprising a membrane structure (support) that can experience strain (see page 7 lines 2-9); and a waveguide element formed on said membrane structure so that when said membrane structure is strained, said waveguide element is tuned to a selective amount (see page 6 lines 16-22, page 9 lines 20-24).

Regarding claims 5-7 and 15-17, Matsuura et al disclose 1-dimensional and 2-dimensional photonic crystals (see page 8 line 29) comprising holes (air, see page 12 line 15).

Regarding claims 10 and 20, Matsuura et al disclose using piezoelectric to produce strain (see page 6 line 31).

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, sot that it is proper to examiner the article and method claims together.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lim et al and further in view of Scheuer et al (US 2004/0008942 A1).

As described above, Lim et al disclose the micro-ring resonator except a microracetrack resonator. Scheuer et al teach oval-like resonators are even more preferable since they provide an increased coupling as compared to a perfect circular ring resonator (see [0014]). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an oval-shaped resonator (microracetrack resonator) in Lim et al as taught by Scheuer et al for coupling efficiency.

7. Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al and further in view of Caracci et al (U.S. Patent 6,445,838 B1).

Matsuura et al disclose using silicon-based substrates that can be physically deformed due to piezoelectric response but does not explicitly teach SiO₂ layer. Caracci et al that silica is expandable in response to the stimulus of heat or a piezoelectric material which is expandable in response to the stimulus of voltage. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to a use silicon based substrate such as SiO₂ in Matsuura et al as taught by Caracci et al to tune the waveguide element.

8. Claims 8, 9, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al.

Regarding claims 8, 9, 18 and 19, as described above Matsuura et al disclose the claimed invention except the claimed strain approximately 1% or 0.2%. Matsuura et al tuning of photonic crystal by stressing the membrane permits precise control of light traveling through the photonic bandgap waveguide (see page 3 lines 24-27, page 6 lines 1-8, and page 8 lines 26-30). Since Matsuura et al provide the same claimed structure and also teaches tuning of the photonic crystal precisely, it would have been obvious to one having ordinary skill in the art at the time the invention was made to tune the device with any desired tuning including the claimed tuning of approximately 1% or 0.2%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Please note, regarding the method claims above, that method claims parallel article claims exactly without the introduction of any particular manufacturing methods, so that it is proper to examine the article and method claims together.

Response to Arguments

9. Applicant argues that Lim et al and Matsuura et al do not teach a flexible membrane structure. However as stated above the newly added limitation "flexible" introduces new matter into the disclosure of the invention and applicant is required to cancel the new matter in the reply to this Office Action.

Applicant also argues that Matsuura et al discusses photonic crystals and supports which have piezoelectric effects and the present invention has photonic crystals and microphotonic elements that do not exhibit piezoelectric effects and are furthermore not bonded to the supports that exhibit piezoelectric effects. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., photonic crystals and microphotonic elements that do not exhibit piezoelectric effects and are furthermore not bonded to the supports that exhibit piezoelectric effects) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant further states that the requirement is that the piezoelectric materials are attached to the membrane structure. The Matsuura et al reference clearly teaches and shows deforming piezoelectric elements of a photonic crystal and/or support due to a piezoelectric response (see column 7 lines 1-10) wherein the photonic crystal is attached to the support (membrane structure, see Figs. 1-4).

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-2348. The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JULIANA KANG
PRIMARY EXAMINER

Juliana Kang
3/30/05